I Claim:

1.   A method of printing an image, the method comprising the steps of:

generating at a host, from an image to be printed, a display list representation of

5   a visually equivalent image comprising non-overlapping graphic objects; and

scan-line rendering, using the display list representation, the visually equivalent

image at a printer communicating with the host, without performing overlap detection at

the printer.

10   2.   A method of converting a representation of a first image, having a first set of

overlapping graphic objects, into a display list representation of a visually equivalent

second image, having a second set of non overlapping graphic objects, said method

comprising the steps of:

(a) categorising each graphic object in the first set as being one of (i) a fully

15   visible graphic object, (ii) a partly visible graphic object, and (iii) an invisible graphic

object;

(b) defining, in relation to each said fully visible graphic object in said first set, a

substantially identical graphic object in the second set; and

(c) defining, in relation to visible regions of each said partly visible graphic

20   object in said first set, one or more graphic objects being visually equivalent to the partly

visible graphic object, in the second set.

3.   A method of converting a representation of a first image, having a first set of

graphic objects spanning a plurality of layers, into a display list representation of a

25   visually equivalent second image, having a second set of graphic objects on a single layer,

said method comprising the steps of:

(a) categorising each graphic object in the first set as being one of (i) a fully visible graphic object, (ii) a partly visible graphic object, and (iii) an invisible graphic object;

(b) defining, in relation to each said fully visible graphic object in said first set, a substantially identical graphic object in the second set; and

(c) defining, in relation to visible regions of each said partly visible graphic object in said first set, one or more graphic objects being visually equivalent to the partly visible graphic object, in the second set.

4.   A method of converting, on a scanline basis, a representation of a first image having a first set of overlapping graphic objects, into a display list representation of a visually equivalent second image having a second set of non overlapping graphic objects, said method comprising, for a current scanline, the steps of:

(a) determining, in a current scanning direction, a leading and a lagging edge of a visible region of a first one of said graphic objects in said first set;

(b) defining said lagging edge to be a leading edge of a next one of said graphic objects if (i) said first graphic object extends beyond said lagging edge in the current scanning direction and (ii) said next graphic object is visible immediately beyond the lagging edge in said current scanning direction;

(c) defining said lagging edge to be a leading edge of a next one of said graphic objects if (i) said next graphic object extends beyond said lagging edge in a direction opposite to the current scanning direction, and (ii) said next graphic object is visible immediately beyond the lagging edge in said current scanning direction; and:

(d) repeating steps (a) to (d) for all successive pairs of leading and lagging edges on the scanline; wherein said pairs of leading and lagging edges establish the second set of visually equivalent graphic objects for said current scanline.

5.   A method of converting, on a scanline basis, a representation of a first image having a first set of graphic objects spanning a plurality of layers, into a display list representation of a visually equivalent second image having a second set of graphic objects on a single layer, said method comprising, for a current scanline, the steps of:

(a) determining, in a current scanning direction, a leading and a lagging edge of a visible region of a first one of said graphic objects in said first set;

(b) defining said lagging edge to be a leading edge of a next one of said graphic objects if (i) said first graphic object extends beyond said lagging edge in the current scanning direction and (ii) said next graphic object is visible immediately beyond the lagging edge in said current scanning direction;

(c) defining said lagging edge to be a leading edge of a next one of said graphic objects if (i) said next graphic object extends beyond said lagging edge in a direction opposite to the current scanning direction, and (ii) said next graphic object is visible immediately beyond the lagging edge in said current scanning direction; and:

(d) repeating steps (a) to (d) for all successive pairs of leading and lagging edges on the scanline; wherein said pairs of leading and lagging edges establish the second set of visually equivalent graphic objects for said current scanline.

6.   A method according to claim 2, wherein at least one of the first set of overlapping graphic objects and the second set of non overlapping graphic objects are opaque.

7.   An apparatus for printing an image, the apparatus comprising:

means for generating at a host, from an image to be printed, a display list representation of a visually equivalent image comprising non-overlapping graphic objects; and

means for scan-line rendering, using the display list representation, the visually

5   equivalent image at a printer communicating with the host, without performing overlap detection at the printer.

8.   An apparatus for converting a representation of a first image, having a first set of overlapping graphic objects, into a display list representation of a visually equivalent

10   second image, having a second set of non overlapping graphic objects, said apparatus comprising:

(a) means for categorising each graphic object in the first set as being one of (i) a fully visible graphic object, (ii) a partly visible graphic object, and (iii) an invisible graphic object;

15   (b) means for defining, in relation to each said fully visible graphic object in said first set, a substantially identical graphic object in the second set; and

(c) means for defining, in relation to visible regions of each said partly visible graphic object in said first set, one or more graphic objects being visually equivalent to the partly visible graphic object, in the second set.

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9.   An apparatus for converting a representation of a first image, having a first set of graphic objects spanning a plurality of layers, into a display list representation of a visually equivalent second image, having a second set of graphic objects on a single layer, said apparatus comprising:

(a) means for categorising each graphic object in the first set as being one of (i) a fully visible graphic object, (ii) a partly visible graphic object, and (iii) an invisible graphic object;

(b) means for defining, in relation to each said fully visible graphic object in said first set, a substantially identical graphic object in the second set; and

(c) means for defining, in relation to visible regions of each said partly visible graphic object in said first set, one or more graphic objects being visually equivalent to the partly visible graphic object, in the second set.

10. An apparatus for converting, on a scanline basis, a representation of a first image having a first set of overlapping graphic objects, into a display list representation of a visually equivalent second image having a second set of non overlapping graphic objects, said apparatus comprising:

(a) means for determining, in a current scanning direction, a leading and a lagging edge of a visible region of a first one of said graphic objects in said first set;

(b) means for defining said lagging edge to be a leading edge of a next one of said graphic objects if (i) said first graphic object extends beyond said lagging edge in the current scanning direction and (ii) said next graphic object is visible immediately beyond the lagging edge in said current scanning direction;

(c) means for defining said lagging edge to be a leading edge of a next one of said graphic objects if (i) said next graphic object extends beyond said lagging edge in a direction opposite to the current scanning direction, and (ii) said next graphic object is visible immediately beyond the lagging edge in said current scanning direction; and:

(d) means for repeating steps (a) to (d) for all successive pairs of leading and lagging edges on the scanline; wherein said pairs of leading and lagging edges establish the second set of visually equivalent graphic objects for said current scanline.

11.   An apparatus for converting, on a scanline basis, a representation of a first image having a first set of graphic objects spanning a plurality of layers, into a display list representation of a visually equivalent second image having a second set of graphic objects on a single layer, said apparatus comprising:

(a) means for determining, in a current scanning direction, a leading and a lagging edge of a visible region of a first one of said graphic objects in said first set;

(b) means for defining said lagging edge to be a leading edge of a next one of said graphic objects if (i) said first graphic object extends beyond said lagging edge in the current scanning direction and (ii) said next graphic object is visible immediately beyond the lagging edge in said current scanning direction;

(c) means for defining said lagging edge to be a leading edge of a next one of said graphic objects if (i) said next graphic object extends beyond said lagging edge in a direction opposite to the current scanning direction, and (ii) said next graphic object is visible immediately beyond the lagging edge in said current scanning direction; and:

(d) means for repeating steps (a) to (d) for all successive pairs of leading and lagging edges on the scanline; wherein said pairs of leading and lagging edges establish the second set of visually equivalent graphic objects for said current scanline.

12.   A computer program for directing a processor to execute a method of converting a representation of a first image, having a first set of overlapping graphic objects, into a display list representation of a visually equivalent second image, having a second set of non overlapping graphic objects, said program comprising:

(a) code for categorising each graphic object in the first set as being one of (i) a fully visible graphic object, (ii) a partly visible graphic object, and (iii) an invisible graphic object;

(b) code for defining, in relation to each said fully visible graphic object in said first set, a substantially identical graphic object in the second set; and

(c) code for defining, in relation to visible regions of each said partly visible graphic object in said first set, one or more graphic objects being visually equivalent to the partly visible graphic object, in the second set.

13.   A computer program for directing a processor to execute a method of converting a representation of a first image, having a first set of graphic objects spanning a plurality of layers, into a display list representation of a visually equivalent second image, having a second set of graphic objects on a single layer, said program comprising:

(a) code for categorising each graphic object in the first set as being one of (i) a fully visible graphic object, (ii) a partly visible graphic object, and (iii) an invisible graphic object;

(b) code for defining, in relation to each said fully visible graphic object in said first set, a substantially identical graphic object in the second set; and

(c) code for defining, in relation to visible regions of each said partly visible graphic object in said first set, one or more graphic objects being visually equivalent to the partly visible graphic object, in the second set.

14.   A computer program for directing a processor to execute a method of converting, on a scanline basis, a representation of a first image having a first set of overlapping graphic objects, into a display list representation of a visually equivalent second image having a second set of non overlapping graphic objects, said program comprising, in relation to a current scanline:

(a) code for determining, in a current scanning direction, a leading and a lagging edge of a visible region of a first one of said graphic objects in said first set;

(b) code for defining said lagging edge to be a leading edge of a next one of said graphic objects if (i) said first graphic object extends beyond said lagging edge in the current scanning direction and (ii) said next graphic object is visible immediately beyond the lagging edge in said current scanning direction;

5   (c) code for defining said lagging edge to be a leading edge of a next one of said graphic objects if (i) said next graphic object extends beyond said lagging edge in a direction opposite to the current scanning direction, and (ii) said next graphic object is visible immediately beyond the lagging edge in said current scanning direction; and:

(d) code for repeating steps (a) to (d) for all successive pairs of leading and 10   lagging edges on the scanline; wherein said pairs of leading and lagging edges establish the second set of visually equivalent graphic objects for said current scanline.

15.   A computer program for directing a processor to execute a method of converting, on a scanline basis, a representation of a first image having a first set of graphic objects 15   spanning a plurality of layers, into a display list representation of a visually equivalent second image having a second set of graphic objects on a single layer, said program comprising, in relation to a current scanline:

(a) code for determining, in a current scanning direction, a leading and a lagging edge of a visible region of a first one of said graphic objects in said first set;

20   (b) code for defining said lagging edge to be a leading edge of a next one of said graphic objects if (i) said first graphic object extends beyond said lagging edge in the current scanning direction and (ii) said next graphic object is visible immediately beyond the lagging edge in said current scanning direction;

(c) code for defining said lagging edge to be a leading edge of a next one of said 25   graphic objects if (i) said next graphic object extends beyond said lagging edge in a

direction opposite to the current scanning direction, and (ii) said next graphic object is visible immediately beyond the lagging edge in said current scanning direction; and:

(d) code for repeating steps (a) to (d) for all successive pairs of leading and lagging edges on the scanline; wherein said pairs of leading and lagging edges establish

5 the second set of visually equivalent graphic objects for said current scanline.